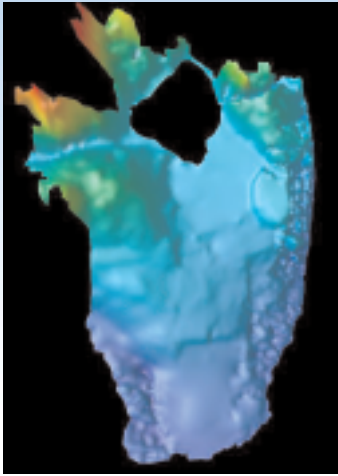splash!

quick facts on…

South Florida Regional Simulation Model (SFRSM) Implementation

NOVEMBER 2004

The South Florida Regional Simulation Model (SFRSM) will provide a next-generation regional modeling tool that can handle the extreme hydrologic complexities of South Florida today and for years into the future.

- All SFWMD Primary and certain select Secondary Canals are directly represented in the model.
- Approximately 250 hydraulic structures utilized by SFWMD Operations are represented in the model.
- Flexible mesh covers 9,720 square miles with 23,896 cells. Triangular cell sizes in urban areas average 0.5 miles per side and 1.0 mile per side in natural areas like the Everglades National Park.
- The SFRSM clearly separates simulation of South Florida's hydrology and water management by SFWMD providing modeling flexibility in scenario investigation.

The South Florida Water Management District *is a regional, governmental agency that oversees the water resources in the southern half of the state. It is the oldest and largest of the state's five water management districts.*

Our Mission is to manage and protect water resources of the region by balancing and improving water quality, flood control, natural systems, and water supply.

The South Florida Regional Simulation Model (SFRSM) is an implementation of the Regional Simulation Model (RSM) covering the major portion of South Florida. This model will be implemented by December 2005 to include calibration, verification and necessary regional level operational functionality to allow simulation useful in providing screening level analysis of alternatives.

This implementation is expected to:

- be the next generation regional hydrologic simulation tool for South Florida, incorporating new technology and data

- provide a modular, easily modified, more scientifically defensible model than the current best available tool, the South Florida Water Management Model

- provide an easier learning curve to conduct regional modeling and create a broader base of individuals and consultants who can run the model

- provide the basis on which future system-wide modeling of management alternatives can be built

What are the main components of SFRSM?

The main components include a Hydrologic Simulation Engine (HSE) and a Management Simulation Engine (MSE). Integration, testing and implementation of the HSE and MSE will be undertaken under the oversight of a Calibration, Verification, Integration and Testing (CVIT) team.

HSE: Hydrologic simulation comprises collating the necessary geographic and time series data to enable hydrologic simulation. Tasks include: domain definition, mesh generation, canal network overlay, collection of necessary data, and implementation, testing and refinement of methods to represent local hydrology (pseudo cells).

MSE: Management in the SFRSM portrays the Central & South Florida System operating rules which govern the operation of Lake Okeechobee and structures in primary and secondary canals. The MSE provides local control and flow simulation through a wide variety of control algorithm selections available to the modeler. Regional scale coordination of structure control is provided to address water resource allocation needs as dictated by the imposed operational policies.

What are the SFRSM General Assumptions?

1. The Domain (Fig. 1) will include the Lake Okeechobee Service area, the Caloosa-hatchee basin in the west (down to S-79), the St Lucie Basin in the east (down to S-80) and natural, agriculture and urban areas south and east of Lake Okeechobee including Everglades National Park.

2. SFRSM mesh will cover the domain with less then 30,000 triangular, non-uniform cells.

3. Parts of the Lake Okeechobee Service Area and Indian Prairie Basin will be simulated using a lumped approach similar to that used in the South Florida Water Management Model (SFWMM).

4. SFRSM will use one-day time input and output; however, internal time steps may be smaller if needed.

5. SFRSM will be a regional scale model and will not specifically model project scale design features.

6. SFRSM will not simulate flood events that require small time-steps, and, hence will not be suited for FEMA flood impact studies.

7. SFRSM will simulate all primary and some secondary canals (Fig. 2)

8. SFRSM will simulate the effects of major levees and flow-barriers.

9. SFRSM will be a single layer model and hence will simulate the surficial aquifer only. However, where possible, it will aggregate data from multiple aquifers.

10. The boundary will trace the coastlines, lakes and sub-basin boundaries where possible.

11. SFRSM will be calibrated and validated for the same period as the SFWMM calibration and validation periods — i.e., from 1981 to 2000.

12. SFRSM will use climactic records from 1965 to 2000 when simulating the current operations and screening alternatives.

13. Development of a RSM application for the Natural System is assumed to be a separate effort and hence is not considered as a part of the scope of the SFRSM implementation.

14. The vertical datum standard for this project will be NGVD29. Horizontal datum is NAD83.

15. All input and output data sets will be created in English units.

16. SFRSM will use data from SFWMM input files and data sources where possible. Some SFWMM input files will be changed to accommodate SFRSM's higher resolution (e.g., topography)

17. The testing and development of graphical user interfaces and performance measures will be excluded from the scope of the SFRSM implementation project.

18. RSM instruction and training will be excluded from the scope of the SFRSM implementation project, but will be conducted under the greater RSM development project.
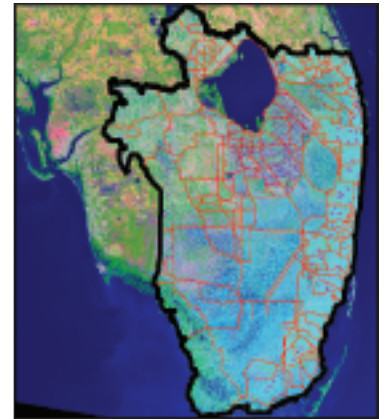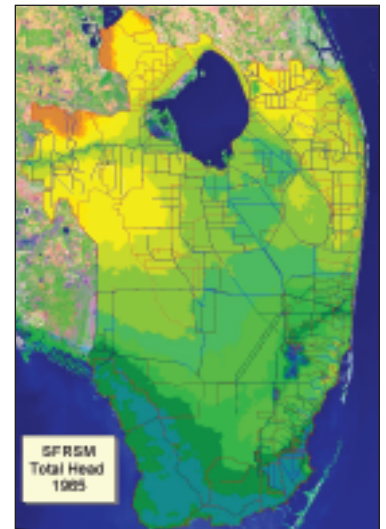

Figure 1

Figure 2

What are the SFRSM Implementation Timelines?

Phase 1: May 2004 – September 2004
Set up, Data Collection & Strategies

Phase 2: October 2004 – December 2004
Initial Testing, Data Refinement & Conceptualization
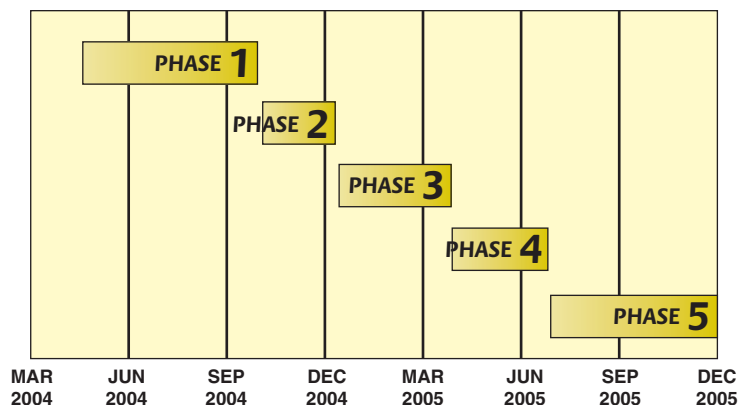
Phase 3: January 2005 – March 2005
HSE/MSE Integration, Initial Calibration & Testing

Phase 4: April 2005 – July 2005
Refined Calibration, Controller – Supervisor Implementation

Phase 5: August 2005 – December 2005
Final Calibration and Verification, partial 2000 Base Implementation

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